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By- Hough, John B.

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It has been demonstrated that interaction analysis is a useful tool for helping teachers not only to hold illustrations of their teaching for future analysis but also to focus on and analyze specific aspects of their verbal instructional behavior. Apparently, four conditions are necessary to enable teachers to analyze and evaluate their instructional behavior: (1) Teachers must want to experiment with and improve their instruction. (2) They must be given a technique or system enabling them to analyze and control their instructional behavior. (3) They must be encouraged to define the types or patterns of instructional behavior with which they wish to experiment. (4) They must have feedback concerning their progress toward instructional goals. Several steps are necessary to make it possible for teachers to experiment with and to improve their verbal instructional behavior. First, they must be provided with administrative support. Second, a small cadre of teachers and/or supervisors must be trained as reliable observers to serve as a standard of reliability for teachers who will be trained later. Third, development of analyses more complex than the present 10-category interaction analysis could be carried out. (This paper was presented at a Title III, Elementary and Secondary Education Act, conference, August 1966.) (Author/SG)

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Dr. John B. Hough
Assistant Dean
Syracuse University
Syracuse, New York

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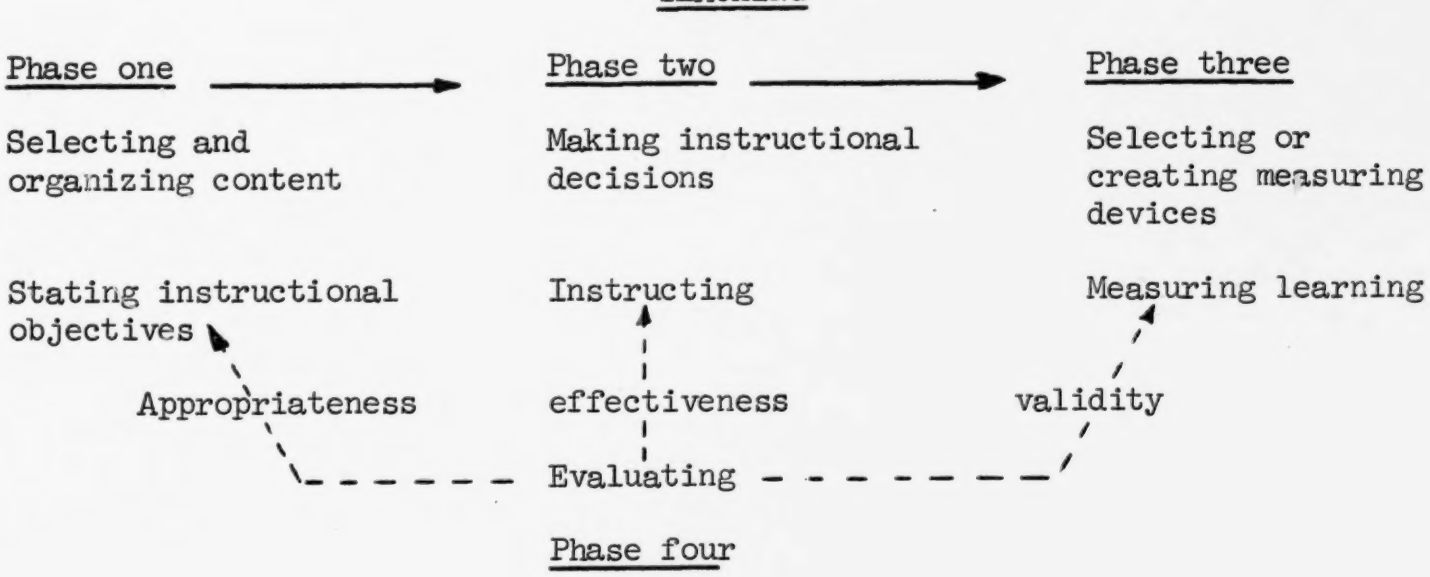
"IDEAS FOR THE DEVELOPMENT OF PROGRAMS RELATING TO INTERACTION ANALYSIS"

The central activity of any educational institution is teaching. Other activities such as those performed by administrative, special services and curriculum development personnel gain sanction only when they function as to support teachers and their teaching. That teaching is the central activity of education may have the ring of a truism. Embodied in this truism is, however, a simple yet pervasive notion that when operationally recognized by educators leads quickly to the realization that educational improvement ultimately means the improvement of teaching.

It is the purpose of this paper to share with you some ideas for improving teaching. These ideas can be tried out in public schools through a combination of inservice and action research projects. In addition, a rather substantial body of research will be cited and discussed that will give credence to the feasibility of improving teaching through creative application of some of the ideas suggested.

For the purposes of this paper, teaching is used to mean a four phase process which includes the following activities: (1) selecting and organizing the content of instruction and stating the objectives of instruction as observable student behaviors, (2) making and implementing instructional decisions, (3) creating measuring devices and measuring student learning, i.e., change in behavior, (4) evaluating the appropriateness of objectives, the effectiveness of instruction and the validity of measurement techniques. These four phases of the process of teaching are illustrated in Figure 1 below.

Figure 1



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Phase one involves primarily curriculum decisions, i.e., the selection and organization of the objectives of instruction whether they be in the cognitive, affective or psychomotor domains. Phase one, therefore, deals with ends not means.

Phase two involves primarily instructional decisions, i.e., the selection and implementation of instructional procedures. These instructional procedures may involve the use of materials or may be solely restricted to teacher and student verbal and nonverbal behavior. Phase two, therefore, deals with means not ends, the means by which student learning is facilitated in terms of the stated objectives of instruction.

Phase three involves primarily measurement decisions, i.e., the creation and use of measurement techniques. What is being measured in the third phase of the teaching act is student learning as evidenced in student behavioral change that is consistent with instructional objectives.

Phase four involves a series of professional judgments regarding the appropriateness of objectives, the effectiveness of instruction and the validity of measurement techniques. Phase four, therefore, deals with the evaluation of teaching in a context of professional accountability. Note that the emphasis is on teacher acceptance of accountability for their actions, not on teacher rating. This is an important distinction in that it asks teachers to be accountable for their own actions. Teacher effectiveness is defined in terms of student achievement that is consistent with realistic objectives of instruction set by teachers. The rating of teachers typically uses external and often less relevant criteria.

With reference to the definition of teaching developed above, the focus of this paper is on instruction (phase two of the act of teaching) and on that aspect of the evaluation of teaching that deals with the effectiveness of instruction. More specifically, this paper deals with (1) the concept of analyzing and controlling verbal instructional behavior, (2) the research on the relationship of verbal instructional behavior and teacher effectiveness and (3) some ideas about how teachers can learn to control and experiment with their verbal instructional behavior for the purpose of becoming more effective teachers.

Ned Flanders[1] has suggested that a visit to a typical elementary or secondary school will reveal that 60 percent of classroom time is taken up in verbal interaction, i.e., talk, and that more than 70 percent of such talk is done by teachers. Teachers use their verbal behavior for a variety of instructional purposes. They may manage activities by giving directions; they may present ideas or opinions by lecturing; they may elicit student involvement by asking questions; and, they may praise, clarify, accept or criticize student ideas or behavior. Clearly then, if only by virtue of its quantity, classroom verbal interaction and particularly teacher talk constitutes an important dimension of instruction. Evidence will be presented later in this paper to

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[1] Flanders, Ned. A. Teacher Influence, Pupil Attitudes, and Achievement. Cooperative Research Monograph, No. 12. Washington: U.S. Government Printing Office, 1965. p. 1.

indicate that the quality, i.e., type of talk used by teachers is even more important than the quantity.

Within the last ten years a number of systems have been developed for classifying and analyzing verbal classroom interaction. Each of these systems provides a unique way of viewing classroom instructional talk. For example, the work of B. Othanel Smith[2] has been primarily addressed to an analysis of the logic of teacher talk; the work of Ned Flanders[3] has been primarily concerned with analyzing classroom social-emotional climate while Hilda Taba[4] has been concerned with a multi-dimensional analysis of the classroom which involves both affective and cognitive factors.

Of all of the systems that have been developed, the one that has evolved from the work of Ned Flanders and his associates has been most widely used. Flanders System of Interaction Analysis presents certain advantages over many other systems that have been developed: (1) The basic system contains only ten categories and thus is easily learned, (2) It was designed for direct, observation of classroom verbal interaction and thus does not require typescripts of classroom talk or video tapes for analysis purposes, (3) It preserves the interactive, cause-effect quality of classroom verbal interaction, (4) It is easily expandable into more than ten categories for more detailed types of analysis.

When the basic ten category system is used teacher talk is recorded under one of four categories of indirect influence, or under one of three categories of direct teacher influence. The remainder of the categories are used for the purpose of recording student talk or silence. A summary of the ten categories of Interaction Analysis is provided in Figure 2.

The analysis is typically done by an observer who seats himself in the back of the classroom and records numbers at three second intervals. The numbers correspond to the categories used in the system. An example will illustrate the technique:

Teacher: "All right, boys and girls. Please quiet down and open your notebooks to your spelling assignment."

(The observer records a 7 for the criticism of the noisy behavior, a

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2 Smith, B. Othanel. "Toward a Theory of Teaching," in Theory and Research in Teaching (Arno Bellack, ed.) New York: Bureau of Publications, Teachers College, Columbia University, 1961, p. 1-10.

3 Flanders, Ned A. "Teacher Influence in the Classroom," in Theory and Research in Teaching, (Arno Bellack, ed.) New York: Bureau of Publications, Teachers College, Columbia, University, 1963, p. 1-10.

4 Taba, Hilda, Samual Levine and Elzey Freeman. Thinking in Elementary School Children. U.S. Department of Health, Education and Welfare, U.S. Office of Education, Cooperative Research Project No. 1574. San Francisco: San Francisco State College, 1964.

Figure 2

SUMMARY OF
CATEGORIES FOR INTERACTION ANALYSIS

TEACHER TALK	INDIRECT INFLUENCE	1. * ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting and recalling feelings are included. 2. * PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying "uh huh?" or "go on" are included. 3. * ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building, or developing ideas or suggestions by a student. As teacher brings more of his own ideas into play, shift to category five. 4. * ASKS QUESTIONS: asking a question about content or Procedure with the intent that a student answer.
	DIRECT INFLUENCE	5. * LECTURES: giving facts or opinions about content or procedure; expressing his own idea; asking rhetorical questions. 6. * GIVES DIRECTIONS: directions, commands, or orders with which a student is expected to comply. 7. * CRITICIZES OR JUSTIFIES AUTHORITY: statements, intended to change student behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing, extreme self-reference.
STUDENT TALK		8. * STUDENT TALK-RESPONSE: talk by students in response to teacher. Teacher initiates the contact or solicits student statement. 9. * STUDENT TALK-INITIATION: talk by students, which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10. * SILENCE OR CONFUSION: pauses, short periods of silence, and periods of confusion in which communication cannot be understood by the observer.

6 for the direction to open the notebooks and 10's as the students get out their notebooks and open to the assignment.)

Teacher: "George, how do you spell receive?"

(The observer records a 4 for the teacher's question.)

Student: "Receive"

(The observer records an 8 for the student's answer.)

Teacher: "Good, that's right. What rule did you use?"

(The observer records a 2 for the praise, followed by a 4 for the question.)

Student: "The i before e rule is the one that applies here. That rule certainly helped me learn to spell a lot of words that I had trouble with before."

(The observer records an 8 for the student's answer and a 9 for the comment about the rule that was not asked for by the teacher but was initiated by the student.)

Teacher: "The i before e rule is useful isn't it."

(The observer records a 3 to indicate the acceptance of the student's idea.)

The recording always arbitrarily starts and ends with category 10 for the purpose of balancing the matrix, as will be seen later. The recording of the sample of interaction from the spelling lesson would consist of a column of numbers as illustrated in Figure 3.

Figure 3

10
)
7
(
6
)
10
(
10
)
10
(
4
)
8
(
2
)
4
(
8
)
9
(
3
)
10

The numbers are then paired and entered into a 10 x 10 matrix as illustrated in Figure 4. Note that each number, with the exception of the first and the last, appear as a part of two pairs. The first number represents the row designation and the second number the column designation.

Figure 4

	1	2	3	4	5	6	7	8	9	10
1										
2				1						
3										1
4								11		
5										
6										1
7						1				
8		1							1	
9			1							
10				1			1			11

Once the data has been entered into the matrix a large number of analyses can be performed which yield provocative insights into teaching and influence patterns. It is beyond the scope of this paper to deal in depth with either the mechanics of or the various types of analysis that are possible from interaction analysis. Those interested in pursuing the ideas in depth are referred to The Role of the Teacher in the Classroom by Edmund Amidon and Ned Flanders.[5]

As was stated earlier, the focus of this paper is on the improvement of instruction, but instruction without a purpose would be haphazard. If teachers wish to experiment in any meaningful way with the analysis and control of their verbal behavior they must first decide on the ends of instruction, i.e., what it is that the students are to learn as a result of instruction. When the ends of instruction are clearly stated as behavioral objectives that can be validly measured, then teachers can experiment with their instructional behavior to determine the most efficient and effective means of achieving these ends. The work of Benjamin Bloom[6] and David Krathwohl[7] provides teachers with a taxonemical system for classifying and analyzing objectives in the cognitive and affective domains. The taxonomy for the psychomoter domain has yet to be developed. Ideas presented in the taxonomies of the cognitive and affective domains should

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5 Amidon, Edmund and Ned Flanders. The Role of the Teacher in the Classroom. Minneapolis: Paul S. Amidon Associates, 1963.

6 Bloom, Benjamin S. and others. Taxonomy of Educational Objectives: Handbook I, Cognitive Domain. New York: Longmans Green, 1956.

7 Krathwohl, David and others. Taxonomy of Educational Objectives: Handbook II, Affective Domain. New York: David McKay Company, Inc., 1964.

provide teachers with a structure for organizing and analyzing the objectives of instruction. Coupled with the work of Bloom and Krathwohl, the work of Robert Mager[8] provides teachers not only with a rationale for the behavioral statement of objectives but, in addition, gives teachers the means by which they may learn to write objectives as descriptions of student behavior. In the area of measurement, a recent book by Frank Gorow[9] will provide a useful reference for the process of selecting and constructing valid measures of student learning.

Once having stated the ends of instruction as observable student behaviors and having created valid devices to measure student learning, teachers can then experiment with and vary their instructional behavior to find the most efficient and effective means of achieving their objectives. Questions such as the following could be subjected to empirical test in action research project.

> What patterns of verbal instructional behavior lead to the most efficient and effective development of student ability to analyze complex relationships when such students are defined as educationally deprived ninth graders of below average achievement?
>
> What patterns of verbal instructional behavior lead students to the most efficient and effective development of values when such students are defined as educationally deprived fifth graders in an inter-city school?

Before teachers race off in quest of answers to such specific questions as these, they should have at least some indication that verbal instructional behavior is, in fact, related to teaching effectiveness. Traditionally, teaching effectiveness has been defined either in terms of internal criteria (the attitudes and achievement of students) or external criteria (the judgment of supervisors or principals). In recent years, however, a number of studies have been conducted that have used either internal or external criterion variables and in which the teacher variable under consideration was verbal instructional behavior as categorized by the Flanders System of Interaction Analysis.

From 1954 to 1960 Ned Flanders conducted a series of studies in Minnesota and New Zealand that were designed to test the hypothesis that the attitudes and achievement of students would be related to the verbal behavior used by their teachers.[10] The first of these studies was conducted in Minnesota from 1954 to 1956. The research design was basic and straight forward. Junior high school classrooms were identified in which students, in general, had constructive attitudes toward school and their teachers. In like manner, classrooms

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8 Mager, Robert F. Preparing Instructional Objectives. San Francisco: Fearon Publishers, 1962.

9 Gorow, Frank, Better Classroom Testing. San Francisco: Chandler Publishing Company, 1966.

10 Flanders, Ned A. "Some Relationships among Teacher Influence, Pupil Attitudes and Achievement," in Contemporary Research on Teacher Effectiveness. (Biddle, Bruce and William Ellena, eds.) New York: Holt, Rinehart and Winston, Inc., 1964, p. 196-231.

were identified in which student attitudes were less constructive. These classrooms were observed and teacher and pupil verbal behavior was categorized using interaction analysis. The teacher influence patterns of the high and low attitude classes were compared and found to differ significantly. The same design was again applied in New Zealand in 1957, this time using standard four classes. Once again teacher influence patterns as expressed in teacher verbal behavior were found to be related to student attitudes.

The third study in this series was again conducted in Minnesota from 1958 to 1960. The design was similar but in addition to student attitudes, student achievement in junior high school mathematics and social studies was also used as a criterion variable. In this study both the attitudes and achievement of students was found to be significantly related to the verbal behavior patterns of teachers.

In 1959 Edmund Amidon[11] conducted a study which further supported the findings of Flanders. The design of Amidon's study was, however, somewhat different. Rather than identifying classrooms in which students had high and lower achievement and then comparing the verbal behaviors used by their teachers, Amidon purposefully varied the teacher verbal behavior factor by having the teacher roll play two distinctly different verbal influence patterns. The students in his sample were junior high school students. His findings once again indicated that the type of verbal behavior used by teachers is related to student achievement.

A more recent study by William LaShier[12] further supports the earlier findings of Flanders and Amidon. In this study the attitudes and achievement of junior high school students in a BSCS Laboratory block on animal behavior were found to be related to the verbal behaviors used by their teachers.

The five studies cited above give substantial support to the assertion that student attitudes toward school and their academic achievement is significantly influenced by the verbal behavior of their teachers. Each of these studies used internal criterion variables. The summaries of the two studies which follow used primarily external criterion variables.

In a study of the verbal behavior of superior elementary school teachers, conducted in 1964 by Edmund Amidon and Michael Giammattee[13], the researchers found that teachers in eastern Pennsylvania who were rated by their supervisors as being superior, differed significantly from other teachers in the same school

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11 Amidon, Edmund and Ned A. Flanders. "The Effects of Direct and Indirect Teacher Influence on Dependent Prone Students Learning Geometry," Journal of Educational Psychology52, 1961. p. 286-291.

12 LaShier, William. "An Analysis of Certain Aspects of the Verbal Behavior of Student Teachers of Eighth Grade Students Participating in a BSCS Laboratory Block," Paper read at the annual meeting of the American Educational Research Association, Chicago, 1966.

13 Amidon, Edmund and Michael Giammattee. "The Verbal Behavior of Superior Teachers," The Elementary School Journal, 65, 1965, p. 283-85.

districts with respect to the type of verbal behaviors that they used in their teaching.

A more recent study by Roger Pankratz[14] in central Ohio in 1965 supports the findings of Amidon and Giammattee. In this study the verbal behavior of senior high school physics teachers who were rated by their building principals as being outstanding teachers differed significantly from the verbal behaviors used by other physics teachers in the same districts.

These seven studies of teacher effectiveness used both internal and external criteria of teacher effectiveness. Each reports findings that the verbal behavior of teachers as categorized by interaction analysis is related to teacher effectiveness. It is interesting to note that in each of these studies effective teaching was characterized by more frequent use of indirect influence such as acceptance and clarification of student feelings, praise and encouragement, acceptance and clarification of student ideas, and less frequent use of directions, commands, rejection and criticism.

Taken together these seven studies represent a wide variety of subject fields, grade levels and geographic locals. They represent recent research which could not have been conducted prior to the development of interaction analysis. In addition these studies provide empirical validation of a theory of social-emotional climate and its affects on human behavior as developed and explicated in earlier work by H. H. Anderson,[15] Ronald Lippitt and Ralph White,[16] John Withall,[17] and Morris Cogan.[18] None of these studies, however, answers such specific research questions as those posed as examples earlier in this paper. Nor do any of these studies give support to the assumption that teachers can readily learn to experiment with and modify their verbal teaching behavior so as to become more effective teachers.

Most of the research done on training teachers to analyze and control their verbal teaching behavior has been done at the preservice level. Five such studies have been conducted within the past four years. In each of these

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14 Pankratz, Roger. "Verbal Interaction Patterns in the Classrooms of Selected Science Teachers: Physics," Unpublished doctoral dissertation, The Ohio State University, 1966.

15 Anderson, Harold H. "The Measurement of Domination and of Socially Integrative Behavior in Teachers' Contacts with Children," Child Development, 10, 1939, 73-89.

16 Lippitt, Ronald and Ralph White. "The Social Climate of Children's Groups," in Child Behavior and Development (Barker, R.G. and others, Eds.) New York: McGraw-Hill Book Co., 1943.

17 Withall, John. "The Development of a Technique for the Measurement of Social-Emotional Climate in the Classroom," Journal of Experimental Education, 17, 1949, p. 347-61.

18 Cogan, Morris. "Theory and Design of a Study of Teacher-Pupil Interaction," Harvard Educational Review, XXVI, 1956, p. 315-42.

studies conducted by John Hough and Edmund Amidon,[19] Jeffery Kirk,[20] Norma Furst,[21] John Hough and Richard Ober,[22] and by Ernest Lehman,[23] preservice teachers were taught interaction analysis as a technique for analyzing and controlling their verbal behavior in student teaching. The research design in each of these studies involved at least one group of teachers who were taught to use interaction analysis and one group that was not. In each case these groups of teachers who were trained to use interaction analysis were found to use significantly different patterns of verbal behavior or were judged by their student teaching supervisors as being more effective.

The problems of training preservice teachers are, of course, quite different from those encountered in the inservice education of teachers. Summarized below are three inservice education projects each of which involved teachers in learning to analyze and control their verbal teaching behavior and in each of which, training in interaction analysis was an important part of the inservice training design. These three studies will serve not only as evidence that inservice teachers can be taught to analyze, control, modify and experiment with their verbal teaching behavior but, in addition, will serve as illustrations of three different approaches to inservice training designs.

The first of these studies was conducted by Ned Flanders in Minnesota during the 1960-1961 school year.[24] This project is illustrative of a rather extensive study involving fifty-seven teachers from two junior high schools. The project was adequately supported by the U. S. Office of Education and was jointly conducted by the University of Minnesota and the Hopkins School District. A control group of six teachers and two experimental groups of twenty-five and twenty-six teachers volunteered to be a part of the inservice study program designed to train teachers to analyze their verbal teaching behavior through the use of interaction analysis. Teachers in the experimental groups were assigned to one of two inservice courses meeting either on Monday evening or Saturday morning. The basic difference between the two groups was that one group was taught by means of a rather direct workshop leader whereas the other was taught by a leader using a more indirect style of teaching. In addition to their

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19 Hough, John and Edmund Amidon. Behavioral Change in Preservice Teacher Preparation: An Experimental Study. Philadelphia: College of Education, Temple University, 1963.

20 Kirk, Jeffery, "Effects of Learning the Minnesota System of Interaction Analysis by Student Teachers of Intermediate Grades," Unpublished doctoral dissertation, Temple University, 1964.

21 Furst, Norma, "The Effects of Training in Interaction Analysis on the Behavior of Student Teachers in Secondary Schools," Paper read at the annual meeting of The American Educational Research Association, Chicago, 1965.

22 Hough, John and Richard Ober. "The Effects of Training in Interaction Analysis on the Verbal Behavior of Preservice Teachers," Paper read at the annual meeting of The American Educational Research Association, Chicago. 1966.

23 Lehman, Ernest. "A Study of the Effect of Pre-service Training in Interaction Analysis on the Verbal Behavior of Student Teachers," Unpublished doctoral dissertation, The Ohio State University, 1966.

24 Flanders, Ned. Helping Teachers Change Their Behavior. Ann Arbor: University of Michigan, 1963.

training in interaction analysis, teachers were encouraged to experiment with their teaching and could, upon their own initiation request a trained research assistant to come into their classroom, take interaction analysis on their teaching, and give them feedback in a subsequent conference. The findings from this study are related to the rather complex research design involving the different styles of the workshop leaders, selected personality variables of the teachers, etcetra. Suffice it to say that the results of the project showed that many inservice teachers did learn to experiment with and modify their verbal teaching behavior.

A much more modest project was conducted by William Hill at the South Western school district in central Ohio during the 1965-66 school year.[25] The project involved thirty-five elementary and secondary school teachers and their building principals. The teachers, like those in Flanders' study, volunteered for the inservice activity. The principals were trained in interaction analysis in a pre-school workshop for which a consultant was engaged as the workshop leader. The teachers attended a series of inservice sessions during the first two months of the school year. The leader of the inservice training sessions for the teachers was the principal investigator of the study. The thirty-five teachers were taught to analyze and control their verbal teaching behavior through the use of interaction analysis. The design of the study involved a series of pre-training and post-training observations of the teachers and in addition used two means of giving teachers feedback regarding their teaching. The first means involved observation of teachers by the building principals during which time the principal took interaction analysis on the teacher followed by a supervisory conference. The second technique involved teachers in tape recording their own classes and then taking interaction analysis on their own teaching. The findings from Hill's study indicate that teachers did change their verbal teaching behavior over the course of the school year. In addition, an attitude questionnaire administered at the conclusion of the study indicated that teachers valued highly this approach to inservice training. Change in verbal teaching behavior was not found to be related to either the type of feedback teachers received concerning their teaching nor to the number of hours of training in interaction analysis, i.e., six hours for one group and eight and ten for the other two.

A third study recently completed by Gertrude Moskowitz illustrates yet another approach to the inservice training of teachers.[26] This project was a collaberative effort involving the school district of Philadelphia and Temple University in the training of student teachers and their cooperating teachers. The design involved two groups of student teachers, one trained and one not trained to interaction analysis and two groups of cooperating teachers, one of which was trained in interaction analysis and one of which was not. The findings from this study deal not only with attitude and behavioral change of the student teachers but in addition with change in the verbal teaching behavior

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25 Hill, William. "The Effects on Verbal Teaching Behavior of Learning Interaction Analysis as an Inservice Education Activity," Unpublished doctoral dissertation, The Ohio State University, 1966.

26 Moskowitz, Gertrude. "The Attitudes and Teaching Patterns of Cooperating Teachers and Their Student Teachers Trained in Interaction Analysis," Unpublished doctoral dissertation, Temple University, 1966.

of the cooperating teachers. The results indicate that this unique approach to the inservice training of teachers, serving as cooperating teachers, has considerable merit. The cooperating teachers who were trained in interaction analysis differed significantly from those cooperating teachers not trained with respect to the type of verbal behaviors they used in their teaching following training.

In each of these three studies there was (as was true in the five studies of preservice training) a tendency for teachers trained in interaction analysis to more often use those verbal behaviors that were, in the seven previous studies cited, associated with more effective teaching. These findings seem to have at least two implications. First, if the research on teacher effectiveness is valid then training teachers in the analysis and control of verbal behavior by teaching them to use interaction analysis seems to provide the conditions for many teachers to become more effective teachers. Secondly, there is considerable evidence that teachers can learn to experiment with and modify their verbal teaching behavior through a variety of inservice training designs.

It is the purpose of the second part of this paper to suggest some ideas which, if creatively applied in inservice training and action research projects would be likely to help teachers become more aware of their use of verbal instructional behaviors in the classroom, and would provide them with knowledge about effective teaching patterns.

It has already been suggested that ultimately teachers must accept as a matter of course, the responsibility for evaluating the effectiveness of their instruction by applying the appropriate internal criterion variable, i.e., the achievement of their students. When teachers do so, they become applied classroom researchers who are constantly testing instructional hypotheses. Certainly, teachers should not be expected to perform formal research on any grand scale, but to hold the attitude that when he teaches he is informally testing an instructional hypothesis is for the teacher to assume the posture of a researcher. Let it be made clear, it is not being suggested here that teachers should, in addition to all of their other responsibilities, double as formal researchers. Yet when a teacher "hypothesizes" that a particular instructional activity will, for his students, lead to optimum student achievement, and then goes about testing that "hypothesis" by experimenting with his instruction and then measuring student learning, he is, in fact, engaged in a type of very basic research.

Before teachers can be expected to assume this attitude toward teaching, however, a series of steps need to be taken. These steps would involve at some point, realistic and frank discussions about what it is that students in their school should be learning. This is not the typical task of developing a list of educational platitudes in the form of bread, nebulus objectives. Rather, this task involves a rigerous and analytical look at instructional objectives and ultimately the writing of such objectives as descriptions of student behavior that can be measured by relatively simple and straight forward measuring devices. Learning cannot be measured unless it can be described. The effectiveness of instruction cannot be evaluated unless the product of instruction, i.e., learning can be measured. Defining objectives of instruction in behavioral terms need not be the first step, but ultimately it needs to be done if

teachers are to assume accountability for their instructional actions.

Since teaching includes not only deciding what shall be taught but the equally important decision of how it shall be taught, and since a large and apparently important aspect of teaching is the verbal instructional behavior of the teacher, it is suggested that as teachers work on defining specific outcomes of instruction, that they also experiment with their verbal instructional behavior. If teaching were less complex, the task would be less difficult. The fact is, however, that the act of teaching and particularly the phase of instruction is a highly complex phenomenon. It is a process which simultaneously involves a number of complex, interacting forces. Unless a teacher has some way to capture the essence of an instructional act at the moment it occurs, it is lost forever. Once lost it cannot be analyzed and evaluated in any meaningful way. The use of tape recordings and more recently video tapes, captures and holds the moment of teaching for further analysis. But even a tape recording holds more than can be conveniently analyzed unless some focus is given to the analysis. A figurative filter or lens needs to be employed if teachers are to focus in on particular aspects of their instruction such as, for example, their use of questions, or their techniques for helping students evaluate their thinking from specific exemplars to generalizations and principles.

Interaction analysis has been demonstrated to be a particularly useful tool for helping teachers not only hold illustrations of their teaching for future analysis, but also to focus on and analyze specific aspects of their verbal instructional behavior. Abstract and fleeting instructional concepts can be represented on the instruction analysis matrix and made concrete. Once abstract instructional concepts can be differentiated from the total instructional context and held "still" for analysis, the conditions are set for teachers to learn a great deal about specific aspects of their instruction. If they are not satisfied with what they see then they can try something different the next time and hold it up for inspection. Too often in the past teachers have been asked to do this task with a "wide view lens". The result has often been that it has been difficult to see the "trees for the forest."

In order for teachers to develop this rather high level skill of analyzing and experimenting with their instructional behavior four conditions would seem desirable, if not necessary. First, teachers must want to experiment with and improve their instruction. Secondly, they must be given a technique or system to help them analyze and control their instructional behavior. Thirdly, they must be encouraged to define for themselves the types or patterns of instructional behavior that they want to experiment with. Finally, they must be able to get feedback concerning their progress toward instructional goals that they have set for themselves. Throughout this process teachers should be encouraged to share ideas, give support and encouragement to others and should feel free to ask questions formed in a nonthreatening manner that will lead to new insights and guide them out of nonproductive channels of activity.

How might teachers proceed with this task of experimenting with instruction and specifically with their verbal instructional behavior? The process of getting teachers involved in this task and providing for them the necessary support in terms of time, flexible schedules, etcetra, will be unique to each school or school system that engages in the process Clearly, however, administrative support in the form of time and flexible schedule arrangements are

necessary to give small groups of teachers planning time, for observation of each other and for discussions and feedback following observations. Another important factor would be provisions for consultant help when necessary at critical stages in the process. Finally, and perhaps most important of all would be the provision of a climate, supported by the administration, in which teachers could feel free to experiment and fail as well as succeed as they grow in understanding of their teaching.

The details of the process of training teachers to analyze and control their verbal instructional behavior would involve many specifics that would also be unique to specific schools and school districts. For example, the availability of financial resources, as well as personnel resources would do much to influence the specifics of a program. The nature of any research proposal which was drawn up as a preliminary step to such activity would in itself influence the specific direction that such a program would take. The ideas which follow, therefore, should be viewed as some possible ideas which should be creatively adapted to the specific conditions and needs of specific schools, not as a packaged plan.

Unless adequate resources are available within the school system one of the first steps to be taken should probably be that of engaging consultative help from either the State Department of Education or some nearby university. Such help would focus on developing a research proposal for an action research project and/or developing initial plans for the inservice training activity.

A second and critical step would be that of developing a small, highly trained cadre of teachers and/or supervisors who could themselves effectively use interaction analysis. This point must be forthrightly stated - the use of interaction analysis to give teachers feedback regarding their teaching implies that data gathered regarding spontaneous teaching behavior be reliable data. A small cadre should be trained as reliable observers who can act as a standard for the reliability of teachers who will be trained later. It is extremely difficult to learn to use the system of interaction analysis by simply reading a manual and then practicing. Such a procedure usually leads to the establishment of and the compounding of observational errors. The result is consistently less than valid data being fed back to teachers. At least two or three members of the staff should be highly trained so that they can train others and act as a base line for helping other teachers become reliable observers. Though the issue of reliability of observation has been made it should not be over made. Getting a trained cadre to begin with is not a highly expensive or difficult task. It needs, however, to be done.

Let us assume that a small cadre of teachers or supervisors has been trained in interaction analysis, that the school district has identified one or more target populations of students or subject areas that they want to focus on, that the process of writing behaviorally stated objectives is underway and that the administration has provided time for teachers to facilitate intervisitation by teachers, and modest funds for some consultant help. What kinds of things might teachers do?

Probably a good place to start would be to train as many teachers as would be interested in the basic ten category system of interaction analysis. Such training should involve learning the categories, learning to be a reasonably

reliable observer, learning to plot and interpret matrix data. Once having learned to use the system as a means of gathering data about instruction and having learned to analyze the meaning of the data gathered, teachers would then be ready to experiment with their verbal behavior using the basic ten category system. Teachers could tape record their own lessons or have colleagues observe them. From interaction analysis data gathered by either method teachers could answer such questions as the following about their teaching:

1. Do I do more talking in the classroom than I want to?

2. Do I typically use a direct, indirect or flexible teaching style?

3. How do I handle student participation? Do I respond differently to teacher elicited and student initiated student talk?

4. Do I help students clarify their responses?

5. Do students tend to resist my influence?

6. Do I recognize student emotion by accepting and clarifying it?

7. How and when do I use praise and encouragement?

8. Do I use criticism effectively?

9. Is there evidence of adequate and appropriate student involvement in my class?

Clinics could be established on a regularly scheduled basis where teachers could pose such questions about their instruction and discuss their teaching.

Once having become comfortable with the process of observing and analyzing their verbal instructional behavior, the staff would be ready for the second phase of the inservice project. This phase involves describing instructional intentions and then attempting to meet these intentions in the classroom. For example, a teacher whose typical pattern in a review or drill session is a 4-8-7 (question, answer, criticism) or 4-8-2 (question, answer, praise) may wish to experiment with the use of category 3 (clarification) both following correct and incorrect responses. In the case correct responses clarification may require the student to think more deeply and explain why his answer was right. In the case of incorrect responses the use of clarification would force the student into thinking through his response and perhaps recognizing not only that his answer was wrong but why. If a teacher wishes to use more category 3 for specific purposes he could easily see from the interaction analysis matrix whether he met his intentions. Through a series of such experiments with their verbal behavior and discussions of the outcomes in small group clinic sessions, teachers can learn to develop control over a wide reperteire of patterns of verbal instructional behavior to be used intentionally for specific instructional purposes.

Phase three of an inservice project could involve graduating from the basic ten category analysis to more complex analyses. This phase should probably involve study of other representative system for the analysis of verbal

instructional behavior. The work of Mary Jane Aschner,[27] Marie Hughes, [28] Arno Bellack,[29] and Hilda Taba[30] would provide the source for a variety of ideas of how the categories of the ten category system could be expanded to yield a number of analyses not possible with the basic system.

Several examples will serve to illustrate how this might be done. By using a four-way classification of questions suggested by the work of Aschner, teachers could analyze the mental processes required by students as a function of the type of questions asked in class. The four types of questions suggested by this approach are cognitive memory questions, convergent questions, divergent questions and judgmental or evaluative questions. Clearly, a teacher who was aware of the type of questions he was asking and could correlate various levels of student thinking as expressed in student responses with the type of questions asked, would have more information about his teaching than a teacher who simply knew that 14% of his verbal behavior during a given lesson was made up of questions.

By using Hughes' concept of public and private criteria following criticism or praise, teachers would have much more exacting data about how they handle praise and criticism in their classes.

How would the inclusion of ideas from the work of others in the field of analyzing verbal teaching behavior affect the basic ten category system? One suggestion provided by Edmund Amidon[31] involves a twenty-five category system combining the ideas of Flanders, Hughes, Aschner and Taba. The basic categories of the system are illustrated in Figure 5.

Certainly many creative combinations of ideas are possible to create catagory systems of more or less than ten classifications.

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27 Aschner, Mary Jane. "The Analysis of Verbal Interaction in the Classroom," in Theory and Research in Teaching. (Arno Bellack, ed.) New York: Bureau of Publications, Teachers College, Columbia University, 1963, p. 53-78.

28 Hughes, Marie. "Utah Study of the Assessment of Teaching," in Theory and Research in Teaching. (Arno Bellack, ed.) New York: Bureau of Publications, Teachers College, Columbia University, 1963, p. 25-26.

29 Bellack, Arno and Joel Davitz, The Language of the Classroom: Meanings Communicated in High School Teaching. U.S. Department of Health, Education and Welfare, Office of Education, Cooperative Research Project No. 1497. New York: Institute of Psychological Research, Teachers College, Columbia University, 1963.

30 Taba, Hilda; Samuel Levine and Freeman Elzey. Thinking in Elementary School Children. U.S. Department of Health, Education and Welfare, U.S. Office of Education, Cooperative Research Project No. 1574. San Francisco: San Francisco State College, 1964.

31 Amidon, Edmund. "Interaction Analysis: Recent Developments," Paper read at the annual meeting of The American Educational Research Association, Chicago, 1966.

Figure 5

CATEGORIES FOR A TWENTY-FIVE CATEGORY SYSTEM
Suggested by Amidon

TEACHER TALK	1.	Accepts feelings
	2a.	Praises
	2b.	Praises using public criteria
	2c.	Praises using private criteria
	3.	Accepts ideas through a. description, b. Inference, c. generalization
	4a.	Cognitive memory questions
	4b.	Convergent questions
	4c.	Divergent questions
	4d.	Evaluative questions
	5.	Lectures
	6.	Gives directions
	7a.	Criticizes
	7b.	Criticizes using public criteria
	7c.	Criticizes using private criteria
STUDENT TALK	8.	Pupil response a. description, b. inference, c. generalization
	9.	Pupil initiated a. description, b. inference, c. generalization
	10.	Silence
	11.	Confusion

Following phase three, or for that matter at any of a number of places in suggested inservice program, teachers would be ready for a wide variety of creative and exciting action research projects that could fall under the "Title III umberalla". Each of these projects, if consistent with the ideas presented in this paper would have, however, the underpinning of a pervasive yet basic notion - that the improvement of education for whatever purpose or for whatever group of students, ultimately means the improvement of teaching. A good place to start might well be with the verbal instructional behavior of teachers.